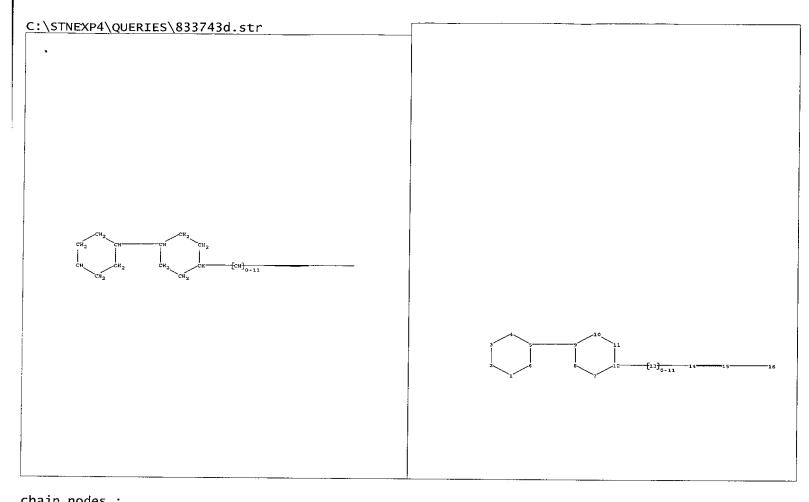


```
chain nodes :
    19   20   21   22
ring nodes :
    1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18
chain bonds :
    2-12   3-19   4-20   9-22   17-21   21-22
ring bonds :
    1-2   1-6   2-3   3-4   4-5   5-6   7-8   7-12   8-9   9-10   10-11   11-12   13-14   13-18   14-15
exact/norm bonds :
    13-14   13-18   14-15   15-16   16-17   17-18   21-22
exact bonds :
    2-12   3-19   4-20   9-22   17-21
normalized bonds :
    1-2   1-6   2-3   3-4   4-5   5-6   7-8   7-12   8-9   9-10   10-11   11-12
```

Match level:
1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom 12:Atom 13:Atom 14:Atom 15:Atom 16:Atom 17:Atom 18:Atom 19:CLASS 20:CLASS 21:CLASS



```
chain nodes :
    13    14    15    16

ring nodes :
    1    2    3    4    5    6    7    8    9    10    11    12

chain bonds :
    5-9    12-13    13-14    14-15    15-16

ring bonds :
    1-2    1-6    2-3    3-4    4-5    5-6    7-8    7-12    8-9    9-10    10-11    11-12

exact/norm bonds :
    1-2    1-6    2-3    3-4    4-5    5-6    7-8    7-12    8-9    9-10    10-11    11-12

exact bonds :
    5-9    12-13    13-14    14-15    15-16
```

Match level:
1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom 12:Atom 13:CLASS 14:CLASS 15:CLASS 16:CLASS

```
2 L6
L7
=> dis 1-2 all hitstr
     ANSWER 1 OF 2 CAPLUS COPYRIGHT 2003 ACS on STN
L7
AN
     2003:114235 CAPLUS
DN
     138:178319
     Entered STN: 14 Feb 2003
ED
     Liquid crystal mixture suitable for active matrix liquid crystal display
TI
     of ECB- or VA-type
     Reiffenrath, Volker; Klasen-Memmer, Melanie; Rillich, Malgorzata
ΊN
     Merck Patent GmbH, Germany
PΑ
     Ger. Offen., 26 pp.
SO
     CODEN: GWXXBX
DT
     Patent
LA
     German
     ICM C09K019-12
         C07C043-225; C07C069-75; C07C069-76; C07C025-18; C07C013-28;
          C07D521-00; C09K019-34; C09K019-44; G09F009-35; G02F001-137
     74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other
CC
     Reprographic Processes)
     Section cross-reference(s): 75
FAN.CNT 1
                                           APPLICATION NO. DATE
     PATENT NO.
                      KIND DATE
     _____
                      ____
                                            ______
    DE 10229828
                       A1
                            20030213
                                           DE 2002-10229828 20020703
PТ
                     A1
A2
                                           US 2002-206978
     US 2003071244
                            20030417
                                                             20020730
                                           JP 2002-222518
     JP 2003119466
                            20030423
                                                             20020731
PRAI DE 2001-10137319 A1 (20010731)
    MARPAT 138:178319
                            late them fillslow, 4/36, 8 his applieds
GΙ
* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *
     The invention relates to a liq. crystal mixt. based on polar compds. with
     neg. dielec. anisotropy, wherein the mixt. comprises 10-45 % of I (R11 =
     C1-12-alkyl, C2-12-alkenyl; R12 = C2-12-alkenyl), 30-85 % of II (R21, R22
     = C1-12-alkyl, alkenyl; Z21 = -C00-, single bond; A21 =
     trans-1,4-cyclohexylene, 1,4-phenylene), and 5-35 % of III (R31, R32 \Rightarrow
     C1-12-alkyl, alkenyl; m=1, 2; A=1,4-trans-cyclohexylene, 1,4-phenylene). The liq. crystal mixt. is suitable for used in active
     matrix liq. crystal displays of ECB (elec. controlled birefringence) or VA
     (vertically aligned) type.
     liq crystal mixt active matrix display VA ECB
ST
     Liquid crystal displays
TΤ
        (liq. crystal mixt. suitable for active matrix liq. crystal display of
        ECB- or VA-type)
IT
     Liquid crystals
        (nematic; liq. crystal mixt. suitable for active matrix liq. crystal
        display of ECB- or VA-type)
                85600-56-2 92263-41-7
IT
     84540-37-4
                                            117713-14-1
                                                           123560-48-5
                                 129738-34-7
                                               155041-85-3
                                                              174350-06-2
     124728-81-0
                   124729-02-8
                   208709-55-1
                                 263017-37-4
                                               279246-65-0
                                                              323178-01-4
     189750-98-9
     478385-88-5 497172-21-1 497172-22-2
     497172-23-3
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
        (liq. crystal mixt. suitable for active matrix liq. crystal display of
        ECB- or VA-type)
```

=> s 16

IT

497172-21-1 497172-22-2 497172-23-3

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(liq. crystal mixt. suitable for active matrix liq. crystal display of ECB- or VA-type)

RN 497172-21-1 CAPLUS CN 1,1'-Biphenvl, 4-etl

1,1'-Biphenyl, 4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-, mixt. with 4-(3-butenyl)-4'-methyl-1,1'-biphenyl, 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene, 1-[(trans,trans)-4'-ethenyl[1,1'-bicyclohexyl]-4-yl]-4-methylbenzene, 1-ethoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-1,1'-biphenyl, 4-ethyl-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl and (trans,trans)-4-(1E)-1-propenyl-4'-propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

Relative stereochemistry.

CM 2

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry.
Double bond geometry as shown.

CM :

CRN 263017-37-4 CMF C21 H32 F2 O

Relative stereochemistry.

CM 4

CRN 208709-55-1 CMF C19 H28 F2 O

Relative stereochemistry.

CM 5

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 6

CRN 155041-85-3 CMF C21 H30 Relative stereochemistry.

CM 7

CRN 124729-02-8 CMF C19 H28 F2 O

Relative stereochemistry.

CM 8

CRN 117713~14-1 CMF C17 H18

$$H_2C = CH - CH_2 - CH_2$$
 Me

CM S

CRN 84540-37-4 CMF C23 H30

RN 497172-22-2 CAPLUS

1,1'-Biphenyl, 4-ethoxy-2,3-difluoro-4'-pentyl-, mixt. with
4-(3-butenyl)-4'-methyl-1,1'-biphenyl, 1-[(trans,trans)-4'-ethenyl[1,1'-bicyclohexyl]-4-yl]-4-methylbenzene, (trans,trans)-4-ethenyl-4'-pentyl-1,1'-bicyclohexyl, 4-ethoxy-2,3-difluoro-4'-propyl-1,1'-biphenyl,
4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl,
4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-1,1'-biphenyl,
4-ethyl-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl and
(trans,trans)-4-(1E)-1-propenyl-4'-propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

Relative stereochemistry.

CM 2

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry.

Double bond geometry as shown.

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 4

CRN 157248-24-3 CMF C17 H18 F2 O

CM 5

CRN 155041-85-3 CMF C21 H30

CRN 129738-34-7

CMF C19 H34

Relative stereochemistry.

Me (CH₂)
$$\frac{R}{4}$$

CM 7

CRN 122412-08-2 CMF C19 H22 F2 O

Eto
$$(CH_2)_4-Me$$

CM

CRN 117713-14-1 CMF C17 H18

CRN 84540-37-4 CMF C23 H30

Relative stereochemistry.

RN 497172-23-3 CAPLUS
CN 1,1'-Biphenyl, 4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-, mixt.
 with 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene,
 1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene,
 1-[(trans,trans)-4'-ethenyl[1,1'-bicyclohexyl]-4-yl]-4-methylbenzene,
 1-ethoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene,
 4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-1,1'-biphenyl,
 4-ethyl-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl, 4-methyl-4'-(3E)-3-pentenyl-1,1'-biphenyl and (trans,trans)-4-(1E)-1-propenyl-4'-propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 478385-88-5 CMF C18 H20

Double bond geometry as shown.

CM 2

CRN 323178-01-4 CMF C22 H26 F2 O

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry. Double bond geometry as shown.

CM 4

CRN 263017-37-4 CMF C21 H32 F2 O

Relative stereochemistry.

CM 5

CRN 208709-55-1 CMF C19 H28 F2 O Relative stereochemistry.

CM 6

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 7

CRN 155041-85-3 CMF C21 H30

CRN 124729-02-8 CMF C19 H28 F2 O

Relative stereochemistry.

$$\begin{array}{c} \text{(CH}_2)_4 \\ \text{Me} \end{array}$$

CM 9

CRN 84540-37-4 CMF C23 H30

Relative stereochemistry.

L7 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2001:760068 CAPLUS

DN 135:296297

ED Entered STN: 19 Oct 2001

TI Liquid crystal mixture with negative dielectric anisotropy for liquid crystal display

IN Klasen, Melanie; Weller, Clarissa; Tarumi, Kazuaki; Bremer, Matthias

PA Merck Patent G.m.b.H., Germany

SO Eur. Pat. Appl., 28 pp. CODEN: EPXXDW

DT Patent

LA German

IC ICM C09K019-30 ICS C09K019-44

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 75

FAN.CNT 1

PATENT NO. KIND DATE APPLICATION NO. DATE ---------ΡI EP 1146104 A2 20011017 EP 2001-107879 20010410 EP 1146104 A3 20020130 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,

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IE, SI, LT, LV, FI, RO
     DE 10112955
                             20011122
                       A1
                                             DE 2001-10112955 20010317
     US 2002014613
                        A1
                             20020207
                                            US 2001-833743
                                                              20010413
                             20011225
     JP 2001354967
                                             JP 2001-116758
                       A2
                                                               20010416
PRAI DE 2000-10018899
                       Α
                             20000414
     MARPAT 135:296297
GI
```

AB The invention relates to a liq. crystal mixt. based on a mixt. of polar compds. with neg. dielec. anisotropy, wherein the liq. crystal mixt. contains at least one compd. represented by I (R11, R12 = C.ltoreq.15-alkyl, alkenyl; Z = -C2H4-, -CH:CH-, -CF2O-, -OCCF2-, single bond) and at least one compd. represented by II (R21 = C.ltoreq.15-alkyl, alkenyl; Alkenyl = linear C2-6-alkenyl). The liq. crystal mixt. is esp. suitable for ECB (elec. controlled birefringence) and IPS (in-plane switching) type liq. crystal displays.

nematic liq crystal mixt neg dielec anisotropy; liq crystal display ECB ST IPS liq crystal mixt

ITLiquid crystal displays

(liq. crystal mixt. with neg. dielec. anisotropy for liq. crystal display)

IT Liquid crystals

(nematic; liq. crystal mixt. with neg. dielec. anisotropy for liq. crystal display)

TΤ 80944-44-1 81936-32-5 84540-37-4 87941-72-8 92263-41-7 123560-48-5 123560-54-3 124729-02-8 124770-58-7 129738-34-7 129738-42-7 154346-21-1 155041-85-3 174350-06-2 189750-98-9 208709-55-1 197012-45-6 263017-37-4 279246-65-0 321395-36-2 323178-01-4 323178~05-8 362053-47-2 362053-60-9 362053-68-7 364765-41-3 364765-42-4 364765-43-5 364765-44-6 **364765-48-0** 364765-49-1 364765-50-4 RL: TEM (Technical or engineered material use); USES (Uses) (liq. crystal mixt. with neg. dielec. anisotropy for liq. crystal display)

IT 364765-41-3 364765-42-4 364765-43-5 364765-48-0

RL: TEM (Technical or engineered material use); USES (Uses) (liq. crystal mixt. with neg. dielec. anisotropy for liq. crystal display)

364765-41-3 CAPLUS RN

1,1'-Biphenyl, 4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-, mixt. CN with 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene, 1-[(trans, trans)-4'-ethenyl[1,1'-bicyclohexyl]-4-yl]-4-methylbenzene, (trans, trans) -4-ethenyl-4'-pentyl-1,1'-bicyclohexyl, 4-ethoxy-4'-(trans-4ethylcyclohexyl) ~2,3-difluoro-1,1'-biphenyl, 4-ethyl-4'-(trans-4propylcyclohexyl)-1,1'-biphenyl and (trans,trans)-4-(1E)-1-propenyl-4'-

propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

Relative stereochemistry.

CM 2

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry. Double bond geometry as shown.

CM 3

CRN 263017-37-4 CMF C21 H32 F2 O

CRN 208709-55-1 CMF C19 H28 F2 O

Relative stereochemistry.

CM 5

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 6

CRN 155041-85-3 CMF C21 H30

CRN 129738-34-7 CMF C19 H34

Relative stereochemistry.

Me (CH₂)
$$\frac{R}{4}$$

CM

CRN 84540-37-4 CMF C23 H30

RN 364765-42-4 CAPLUS
CN 1,1'-Biphenyl, 4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-, mixt.
with 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene,
1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene,
1-ethoxy-2,3-difluoro-4-[(trans,trans)-4'-propyl[1,1'-bicyclohexyl]-4yl]benzene, 4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-1,1'biphenyl, (trans,trans)-4-ethenyl-4'-pentyl-1,1'-bicyclohexyl,
4-ethyl-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl, (trans,trans)-4pentyl-4'-propyl-1,1'-bicyclohexyl and (trans,trans)-4-(1E)-1-propenyl-4'propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

Relative stereochemistry.

CM 2

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry.

Double bond geometry as shown.

CM 3

CRN 263017-37-4 CMF C21 H32 F2 O Relative stereochemistry.

CM 4

CRN 208709-55-1 CMF C19 H28 F2 O

Relative stereochemistry.

CM 5

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 6

CRN 129738-34-7 CMF C19 H34

Me
$$(CH_2)^{\frac{R}{4}}$$

CRN 123560-48-5 CMF C23 H34 F2 O

Relative stereochemistry.

CM 8

CRN 92263-41-7 CMF C20 H38

Relative stereochemistry.

CM 9

CRN 84540-37-4 CMF C23 H30

Relative stereochemistry.

RN 364765-43-5 CAPLUS

1,1'-Biphenyl, 4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-, mixt. with 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene, 1-ethoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 1-ethoxy-2,3-difluoro-4-[(trans,trans)-4'-propyl[1,1'-bicyclohexyl]-4-yl]benzene, 1-ethoxy-4-[(trans,trans)-4'-propyl[1,1'-bicyclohexyl]-4-yl]benzene, 4-ethyl-4'-(trans-4-propylcyclohexyl)-1,1'-biphenyl, (trans,trans)-4-pentyl-4'-propyl-1,1'-bicyclohexyl and (trans,trans)-4-(1E)-1-propenyl-4'-propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

Relative stereochemistry.

CM 2

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry.
Double bond geometry as shown.

CRN 263017-37-4 CMF C21 H32 F2 O

Relative stereochemistry.

CM 4

CRN 208709-55-1 CMF C19 H28 F2 O

Relative stereochemistry.

CM 5

CRN 124729-02-8 CMF C19 H28 F2 O

$$\begin{array}{c} \text{(CH}_2)_4 \\ \text{Me} \end{array}$$

CRN 123560-48-5 CMF C23 H34 F2 O

Relative stereochemistry.

CM 7

CRN 92263-41-7 CMF C20 H38

Relative stereochemistry.

CM 8

CRN 84656-78-0 CMF C23 H36 O

CRN 84540-37-4 CMF C23 H30

Relative stereochemistry.

RN 364765-48-0 CAPLUS

1,1'-Biphenyl, 4-ethoxy-2,3-difluoro-4'-(trans-4-propylcyclohexyl)-, mixt. with 1-[(trans,trans)-4'-(3-butenyl)[1,1'-bicyclohexyl]-4-yl]-4-methylbenzene, 1-butoxy-2,3-difluoro-4-(trans-4-pentylcyclohexyl)benzene, 1-butoxy-2,3-difluoro-4-(trans-4-propylcyclohexyl)benzene, (trans,trans)-4-ethenyl-4'-pentyl-1,1'-bicyclohexyl, 1-ethoxy-2,3-difluoro-4-[(trans,trans)-4'-propyl[1,1'-bicyclohexyl]-4-yl]benzene, 4-ethoxy-4'-(trans-4-ethylcyclohexyl)-2,3-difluoro-1,1'-biphenyl, (trans,trans)-4-pentyl-4'-propyl-1,1'-bicyclohexyl and (trans,trans)-4-(1E)-1-propenyl-4'-propyl-1,1'-bicyclohexyl (9CI) (CA INDEX NAME)

CM 1

CRN 323178-01-4 CMF C22 H26 F2 O

CRN 279246-65-0 CMF C18 H32

Relative stereochemistry.
Double bond geometry as shown.

CM 3

CRN 263017-37-4 CMF C21 H32 F2 O

Relative stereochemistry.

CM 4

CRN 208709-55-1 CMF C19 H28 F2 O Relative stereochemistry.

CM 5

CRN 189750-98-9 CMF C23 H28 F2 O

Relative stereochemistry.

CM 6

CRN 129738-42-7 CMF C23 H34

CRN 129738-34-7 CMF C19 H34

Relative stereochemistry.

CM 8

CRN 123560-48-5 CMF C23 H34 F2 O

Relative stereochemistry.

CM :

CRN 92263-41-7 CMF C20 H38

Me
$$(CH_2)^{\frac{R}{4}}$$

•	
	FILE 'REGISTRY' ENTERED AT 19:22:18 ON 15 DEC 2003
L1	STRUCTURE UPLOADED
L2	STRUCTURE UPLOADED
L3	0 S L1 AND L2
L4	17 S L1
L5	6 S L2
L6	7 S L1 AND L2 FUL
	FILE 'CAPLUS' ENTERED AT 19:23:35 ON 15 DEC 2003
L7	2 S L6